

REMARKS

A request for a corrected filing receipt to correct the inventor's name to Allen Le Roy LIMBERG has been filed with the Office of Initial Examination's Customer Service Center. LIMBERG, not ROY, is applicant's family name. Allen Le Roy is applicant's given name, not his last name.

Claims 1-32 remain active in this application. Claims 6-19 are allowed.

However, there appears to have been a mistake in the dependency of original claim 10, which mistake is corrected. Claim 8 is drawn to a combination including a tuner, not to a tuner. Claim 10 ultimately depends from claim 6, which already recites "a second bandpass coupler network" so original claim 10 was informal. Quite clearly, claim 10 should have depended from claim 6, and correction is made accordingly. Currently amended claim 10 and claims 11-13 dependent therefrom should be allowable, since claim 10 depends from an allowed claim and is no longer informal.

Objections to Claim 1

Claim 1 is amended at the point indicated in the objection.

Objections to Claims 4, 5, 20, 21 and 23-25

Claims 4, 5, 20, 21 and 23-25 are objected to as being dependent upon a rejected base claim, but were indicated to be allowable if rewritten in independent form including all the limitations of the base claim.

Claim 4 is re-written in independent form, placing claims 4, 5, 20 and 21 into condition for allowance.

Claim 23 is re-written in independent form, placing claims 23, 24 and 25 into condition for allowance.

Election/Restrictions

Claims 26-32, which the Examiner withdrew from his consideration, are amended to depend from claim 5. Applicant believes the amendments of claims 4 and 26-32 puts claims 26-32 in condition for allowance. The subcombinations set forth in Claims 26-32 as previously presented have no apparent utility other than as a remote control apparatus specifically for use with a remote tuner of the type specified in original claim 5, so restriction as to Claims 26-32 appears to have been improper. In order to advance prosecution and reduce the issues for possible appeal, claims 26-32 are amended to depend from claim 5. This claims the inventions as components of combinations, rather than claiming separate subcombinations.

Claim Rejections - 35 USC § 103

Claims 1, 2, 3 and 22 are rejected under 35 USC 103(a) as being unpatentable over U. S. patent No. 5,809,088 (Han) in view of U. S. patent No. 4,608,710 (Sugiura). These rejections are traversed as failing to comply with the final sentence of 35 USC 103(a), although claims 1 and 3 are amended to place the claims in better form, should appeal prove necessary. The rejection confuses the first amplifier that applicant uses to drive the transmission line with a conventional frequency-selective IF voltage amplifier. The application treats the conventional frequency-selective IF voltage amplifier as part of the front-end circuitry, so amendment is necessary to clarify the issues between Examiner and applicant.

Claim 1 is amended to specify “said tuner further equipped for driving a first end of a transmission line several meters long with said intermediate-frequency signals to be supplied from a second end of said transmission line to further digital television signal reception apparatus that recovers baseband digital television signals” and “said tuner separately packaged from said further digital television signal reception apparatus and an apparatus for supplying remote control information”. As conceded in the final Office Action, Han does not specify that the tuner is designed for driving a transmission line several meters long with intermediate frequency signals. Moreover, Han provides no suggestion that his double conversion tuner 2 is packaged separately from further digital television signal reception apparatus that recovers baseband digital television signals.

Han shows his SAW filter 4 and IF amplifier 6 outside his tuner 2. The rejection of claim 1 appears to be based in part on confusion concerning different definitions of terms, such as

“tuner” and “front-end circuitry”. Accordingly, claim 1 is amended to clarify the issues for appeal, should appeal prove necessary.

Claim 1 is further amended to specify “frequency-conversion circuitry included within said electrically controlled front-end circuitry for supplying a first intermediate-frequency signal with prescribed first carrier frequency as a frequency-conversion response to the one of the radio-frequency signals within said very-high-frequency and ultra-high-frequency bands that is selected for reception by said electrically controlled front-end circuitry, that said one of the radio-frequency signals being selected for reception responsive to said remote control information supplied from said apparatus for supplying remote control information”. This corresponds to Han’s element 2, which his application calls a “tuner”. Claim 1 is further amended to specify “an intermediate-frequency voltage amplifier included in said electrically controlled front-end circuitry and connected for supplying said output port of said electrically controlled front-end circuitry with an amplified response to said first intermediate-frequency signal”, which corresponds to Han’s IF amplifier 6.

Clearly, then, the Han DTV receiver does not have “a cable-driver amplifier having an input port connected to receive said frequency-selective amplified response to said first intermediate-frequency signal from the output port of said first electrically controlled front-end circuitry and having an output port equipped for supplying a further amplified response to said first intermediate-frequency signal to said transmission line and thence to said further digital television signal reception apparatus via said transmission line, rather than said intermediate-frequency signals being directly supplied from said intermediate-frequency voltage amplifier to said further digital television signal reception apparatus”, which amended claim 1 specifies. Han shows no transmission line between his IF amplifier 6 and his carrier wave restoring device 10 as would occasion the need for a cable-driver amplifier.

The 35 USC § 103 rejection of claim 1 fails to take the transmission line and its location within the DTV receiver into proper account. The 35 USC § 103 rejection of claim 1 characterizes the first amplifier incorrectly as being the IF voltage amplifier in the front-end circuitry, so the cable-driver amplifier can be ignored. The examination of claims 1 and 2

particularly concentrates on similarities of the embodiments of the invention to the prior art, while dismissing the differences that are important to the invention.

The invention is directed to changing overall receiver layout in a DTV receiver, so as to solve several problems with prior-art DTV reception. Some of these problems concern avoiding overload of the first mixer — namely, cross-modulation distortion and third-order inter-modulation distortion, sometimes referred to as adjacent channel interference (ACI). Some of these problems concern reflections on the downlead transmission line, caused by the antenna or the receiver incorrectly terminating the transmission line, causing multipath conditions that overtax the adaptive equalizer. Applicant's solution to these problems can provide gain to compensate for downlead losses, but this is incidental to the invention.

It should be noted that these problems are observed in reception systems in which received signals have sufficient strength that an auxiliary low-noise-figure amplifier would not be needed to compensate for downlead transmission line losses. It is common knowledge that in the past most outdoor antenna installations for VHF and UHF reception have not required nor employed auxiliary amplifiers. Downlead transmission line losses at VHF and low UHF used for DTV are much less than for the superhigh-frequency (SHF) signals in satellite broadcasting.

"Assuming, for argument, that the law is absolute that there can be no patent for the new use of an old thing, that is because the statute allows no monopolies merely for ideas or discoveries. If the thing itself be new, very slight structural changes may be enough to support a patent, when they presuppose a use not discoverable without inventive imagination. We are to judge such devices, not by the mere innovation in their form or material, but by the purpose which dictated them and discovered their function." From opinion of Judge Learned Hand in **Traitel Marble Co. v. U.T. Hungerford Brass & Copper Co.**, 18 F.2d 66, 68. Cited with approval in **Shell Development Co. v. Watson, Comr. Pats.**, 149 F. Supp. 279, 113 USPQ 265 (D. D.C. 1957), *aff'd per curiam* 282 F.2d 861, 116 USPQ 428 (D.C. Cir. 1958).

The question under 103 is whether the subject matter as a whole would have been obvious. **In re Van Venrooy**, 56 CCPA 1199, 1203 n.4, 412 F.2d 250, 253 n.4, 162 USPQ 37, 39 n.4 (1969). Prior art patents are references only for what they clearly disclose or suggest; it is not proper use of a patent as a reference to modify its structure to one which prior art references

do not suggest. **In re Randol & Redford**, 425 F.2d. 772, 57 P.A. 1085, 165 USPQ 586, 588 (CCPA 1970). In a proper obviousness determination "[w]hether the changes from the prior art are "minor, ... the changes must be evaluated in terms of the whole invention, including whether the prior art provides any teaching or suggestion to one of ordinary skill in the art to make the changes that would produce the patentee's device." **In re Chu**, 66 F.3d 292, 298, 36 USPQ2d 1089, 1094 (CAFC 1995) citing **Northern Telecom, Inc. v. Datapoint Corp.**, 908 F.2d 931, 935, 15 USPQ2d 1321, 1324 (CA FC), *cert. Denied*, 498 U.S. 920(1990); **In re Jones v. Hardy**, 727 F.2d 1524,1528, 220 USPQ 1021, 1024 (CAFC 1984). In delineating the invention as a whole, we look not only to the subject matter which is literally recited in the claim in question ... but also to those properties of the subject matter which are inherent in the subject matter *and* are disclosed in the specification. **In re Davies**, 475 F.2d 667, 177 USPQ 381 (CCPA 1973), **In re Antonie**, 559 F.2d 618, 195 USPQ 6,8 (CCPA 1977). The rejection is faulty because it ignores or minimizes the change in the overall receiver layout of a DTV receiver and the profound effects it has on DTV receiver performance under adverse reception conditions.

The 35 USC § 103 rejections of the claims 1, 2, 3 and 22 focus on the obviousness of the modifications, rather than on the obviousness of the claimed invention as a whole, a procedure indicated to be erroneous in **In re Kramer**, 18 USPQ2d 1415, 1416 (CA FC 1991) when the court overturned a 35 USC § 103 rejection by a Board of Appeals and Interferences.

The 35 USC § 103 rejections appear to be based on hindsight reconstruction of applicant's invention taking advantage of applicant's own inventive teaching and the Examiner's design capability, rather than on an objective view of the prior art. The rejections of claims 1 and 2 stress similarities of operation and ignore the differences of the claimed structures from the Han apparatus. As indicated in **Titanium Metals Corp. v. Banner**, 778 F.2d. 775, 227 USPQ 773,777 (CA FC 1985) it is the differences from the prior art that are to be considered in determining whether or not an invention is patentable under 35 USC § 103. ...apparatus claims cover what a device *is*, not what a device *does*. An invention need not *operate* differently than the prior art to be patentable, but need only *be* different. **Hewlett-Packard Co. v. Bausch & Lomb, Inc.**, 15 USPQ2d 1525, 1528 (CA FC 1990). Or perhaps more accurately, be *unobviously* different. Footnote 2, **Id.** Here, while applicant's DTV receiver operates similarly to Han's under favorable reception conditions, DTV receiver performance under adverse

reception conditions is improved in ways that would not have been expected by one of ordinary skill in the art.

The Han reference contains no reference to the introduction of a transmission line following front-end circuitry in any of the various DTV signal reception apparatuses of FIGURES 1, 2, 4, 8, 9 and 10. Apparently, the Examiner looks to Sugiura for supplying motivation for so modifying the Han DTV receiver. The satellite broadcast signals used by Sugiura are apparently 30-MHz-wide FM signals that are converted into 8-MHz-wide NTSC-like analog TV signals within the station selector 21, then remodulated within the station selector 21 as a VSB signal for application to the conventional TV receiver 22. See col. 6, lines 50-52.

Sugiura describes the station selector 21 of his satellite reception apparatus being followed by a conventional TV receiver for receiving television signals within very-high-frequency or ultra-high-frequency bands prescribed for terrestrial television broadcast transmitters. So, before applicant's invention, one of ordinary skill in the art would not have discerned in Sugiura any suggestion to modify a conventional TV receiver to interpose a transmission line following its front-end circuitry. The only apparent impetus for modifying the Han reference reposes in applicant's inventive teaching.

Modifying Sugiura to use digital TV signals does not result in the modified Han DTV receiver the Examiner apparently suggests, because of the presence of the station selector 21 Sugiura used to remodulate frequency-modulated TV signals.

"Each-element-is-old" approach to patentability issue is improper. **Amstar Corp. v. Envirotech Corp. et al.**, 221 USPQ 649, 730 F.2d 1476 (CA FC 1983). Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination. Under section 103, teachings of references can be combined only if there is some suggestion or incentive to do so. **ACS Hospital System, Inc. v. Montefiore Hospital**, 732 F. 2d 1572, 221 USPQ 929 (CA FC 1984). The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggested the desirability of the combination or modification. **In re Mills**, 916 F.2d 680, 16 USPQ2d 1430 (CA FC 1990); **MPEP** § 2143.01. The mere fact that the prior art could be modified in the manner proposed by the examiner would

not have made the modification obvious unless the prior art suggested the desirability of the modification. ***Ex parte Dussaud***, 7 USPQ2d 1818, 1820 (PTOBA&I 1988).

Moreover, Sugiura is in a different field of art with different problems than encountered in designing receivers for digital television signals within very-high-frequency or ultra-high-frequency bands prescribed for terrestrial television broadcast transmitters. In column 1, lines 10-12, of his patent Sugiura specifies: “ This invention relates to apparatus for receiving broadcast **microwave** signals from broadcasting satellites.” Satellite broadcasting uses SHF or EHF bands. The preamble of applicant’s claim 1 was amended to make clear that its scope extended only to a “tuner for digital television signals within very-high-frequency or ultra-high-frequency bands prescribed for terrestrial television broadcast transmitters”. The transmission media are different in the two fields of radio reception; and the frequency bands different, requiring differences in the layout of the receivers and types of tuners for these two fields of endeavor. The forms of modulation used in satellite broadcasting are incompatible with TV receivers for over-the-air VHF and UHF signals, and signal conversion apparatus is necessary before such TV receivers. “This court has repeatedly cautioned against employing hindsight by using the applicant's disclosure as a blueprint to reconstruct the invention out of isolated teachings in the prior art. See, e.g., *Grain Processing v. American Maize-Products Co.*, 840 F.2d 902, 907, 5 USPQ2d 1788, 1792 (Fed. Cir. 1988).” **In re Kramer**, 18 USPQ2d 1415, 1416 (CA FC 1991). In order to rely on a reference as a basis for rejection of an applicant's invention, the reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the inventor was concerned. **In re Oetiker**, 977 F.2d 1443, 24 USPQ2d 1443, 1445 (CA FC 1992); MPEP § 2141.01(a).

Sugiura opts for down-converting various TV channels in the microwave transmissions to the same intermediate frequencies, so as to avoid the need for across-the-band amplitude-equalization to compensate for higher attenuation losses in the transmission line at higher-frequency TV channels. Such across-the-band amplitude-equalization is practical in satellite transmission because all TV channels are transmitted at similar power levels, and the equalizer is designed so its response complements transmission line roll-off. VHF or UHF DTV signals broadcast by terrestrial transmitters, which may be located at various directions and distances from the reception antenna, can and customarily do vary greatly in signal strength. This would

make across-the-band amplitude-equalization impractical, except on the basis of a custom design for each DTV reception system. Furthermore, the relative signal strengths of the various channels change with the time of day, with the seasons, with weather and with solar storms. So, it is not convincing to argue that Sugiura would in 2001 have motivated one of ordinary skill in the art of DTV receiver design to change the overall receiver layout in DTV receivers such as Han's. There is no evidence that the motivation for down-converting various TV channels to the same intermediate frequencies when receiving microwave signals transmitted by satellite would have appeared to one of ordinary skill in the art of DTV receiver design to carry over to DTV receivers. The motivations for down-converting various VHF or UHF DTV signals to the same intermediate frequencies have to do with operating the mixer favorably under severe adjacent-channel interference conditions and being better able to suppress reflections on the download transmission line. Such motivations are disclosed in the application under rejection, not in the prior art currently of record. It is only when Sugiura is considered retrospectively after the invention described by applicant that Sugiura is perceived as having any significant relevance to the problems encountered when receiving VHF and UHF DTV signals.

In 2001 a desire to supply gain to make up for transmission line losses would have been insufficient motivation for one of ordinary skill in the art to have changed DTV receiver layout to relocate the tuner to the antenna site. Wideband gain was readily available at the frequencies used for TV broadcasting from terrestrial transmitters, and most outdoor reception antenna installations for VHF and UHF TV signals did not employ auxiliary amplifiers. DTV has been mandated by the U.S. government for over-the-air TV broadcasting from terrestrial transmitters, with the objective of reclaiming the upper UHF channels 52-69 from such service and selling transmission rights in these frequencies. So, transmission line losses at microwave frequencies of a few GHz are not of concern in DTV, because transmission frequencies are all below 400 MHz. As Sugiura points out, transmission line losses are of much less concern at lower frequencies.

One notes that outdoor reception antenna systems for analog TV broadcast from terrestrial transmitters in the VHF and UHF bands used wideband low-noise-figure amplifiers to overcome low signal strength. Prior art practice is direct evidence of the actual lack of any motivation to down-convert various UHF and VHF TV channels to the same intermediate

frequencies. Direct evidence of what was actually obvious to those of ordinary skill in the art at the time of applicant's invention should be given more weight than speculation based on imaginary prior art assembled with the benefit of hindsight gained from applicant's own disclosure and references fished from a different art.

In a proper inquiry pursuant to 35 USC § 103, applicant's invention should be evaluated taking into consideration practice in the terrestrial broadcasting digital television art in January 2001. Because DTV broadcast receivers did not perform as well as many persons thought they should, the Advanced Television Systems Committee, the industry-wide organization developing standards for the DTV receiver industry, had set up a Task Force on RF System Performance which drew experts from the entire industry. Later in 2001 an Ad Hoc Group in the task force evaluated VSB Performance in a report "Performance Assessment of the ATSC Transmission System, Equipment and Future Directions", which is not available to the public. Pertinent portions of that report including pp. 1, 2 and 24-30 are appended to this response. Subsection 7.1.1 and 7.1.11 are of particular interest here. Applicant served as a member of the task force and the ad hoc group. Applicant made the proposal for changing overall receiver layout, referred to in subsection 7.1.11. The last two paragraphs on page 24 and the initial two paragraphs on page 25 are specifically of interest. The initial paragraph of page 25 indicates that experts in the group recommended the use of a low-noise-figure RF amplifier between the antenna and DTV receiver when signal strength is low. The final line of that next-to-last paragraph of subsection 7.1.1 refers to applicant's proposal. Except for applicant's proposal to change overall receiver layout, that low-noise-figure RF amplifier was contemplated to be a wideband amplifier, as used in analog TV practice.

A wideband low-noise-figure amplifier between the antenna and DTV receiver overcomes low-signal-strength problems, caused by any number of problems, which could include transmission line losses. Usually, in terrestrial DTV broadcasting low signal strength is caused by a poor over-the-air link between the broadcast DTV transmitter and the DTV receiver, rather than losses in the download from reception antenna to DTV receiver being a major factor in causing low signal strength. The DTV transmitter may be operated at low power or over the horizon at the receiving site. The DTV receiver may use an inadequate antenna, such as an indoor antenna under the roof of the building the receiver is located in. The reception antenna

may be directed for reducing multipath, rather than for maximum signal strength. Problems with the transmitter to receiver link in satellite broadcasting usually have to do with antenna misdirection or local weather interference, problems that cannot be solved using auxiliary amplification, whether wideband or narrowband.

If the Han DTV receiver was faced with problems of low signal strength, there is little question but that in January 2001 the normal procedure would have been to introduce a wideband low-noise amplifier between the antenna and the Han DTV receiver to overcome this problem. Such procedure would have avoided the need for re-packaging elements of the Han DTV receiver into separate packages, a practice that was not found in prior art TV design and presumably would be dismissed in superficial consideration as undesirable for commercial reasons. So, at the time applicant's invention was made, there was no impelling specific motivation for one of ordinary skill to make applicant's particular invention to overcome transmission line losses. As indicated in applicant's Background of Invention, there were more significant reasons for making his invention.

In microwave TV transmissions from satellites, all channels have substantially the same signal strength. Accordingly, intermodulation and cross-modulation are not severe problems when wideband amplifiers spanning several TV channels are used when receiving microwave TV transmissions from satellites. VHF or UHF DTV signals broadcast by terrestrial transmitters, which may be located at various directions and distances from the reception antenna, can vary greatly in signal strength. Also, DTV broadcasts are apt to be made at taboo frequencies. Accordingly, intermodulation and cross-modulation problems are likely to be severe because of strong signals overloading the first mixer in the DTV receiver, and gain reduction to reduce overload not being feasible when a weaker channel is selected for reception. These problems become more and more significant as the DTV broadcast spectrum fills up with full-power terrestrial broadcast transmitters. Narrowband conversion of frequency is used in applicant's invention in order to avoid strong signals overloading the first mixer, which is likely to cause cross-modulation (and intermodulation) problems. Before the Ad Hoc Group evaluated VSB performance persons of ordinary skill in the art of DTV receiver design appear to have been little if at all aware of the difficult intermodulation and cross-modulation problems that could affect digital reception, largely owing to the unfortunate choice of 8VSB modulation.

Many of the problems with reception of 8VSB digital TV signals have to do with the need for linearity in the front end circuitry in order that data slicing to the eight modulation levels will proceed satisfactorily. The deleterious effects of first mixer overloading on multiple-level data slicing were not given sufficient consideration by the DTV system designers. A possible reason for this oversight was that NTSC analog TV signal was designed to withstand first mixer overloading. It had an FM audio carrier and a gamma-corrected video carrier with substantial sync pulses that could bear crushing. Analog TV broadcasting benefited from less dense, more favorable allocation of channel assignments than DTV broadcasting will be accorded. So, linearity in the front end circuitry was substantially less of an issue in analog TV than it is proving to be in 8VSB DTV.

The severity of mixer-overload problems when broadcasting DTV from terrestrial transmitters has recently started to received more attention in the terrestrial DTV broadcasting industry at large. A paper by Oded Bendov and Dr. C. B. Patel titled "Television Receiver Optimization in the Presence of Adjacent Channel Interference" was delivered before an IEEE Symposium on Broadcasting in October 2004 and was later published. Dr. Patel has e-mailed applicant a copy of the paper, which is not prior art, but is attached as further evidence of the state of the art. Note the recommendations of this 2004 paper to provide channel selectivity and gain adjustment before the DTV receiver, to help avoid a strong adjacent-channel DTV signal generating unacceptably large IM_3 and XM products that fall into a weak desired channel. Note that applicant's invention, which is one way to pursue these desiderata, was constructively reduced to practice more than three years earlier.

Microwave transmissions are line-of-sight, and so multipath reception problems are normally of less concern and equalization filtering to overcome multipath is simple. Sugiura did not address DTV transmission, and the questions of transmission line effects upon multipath are not of particular concern in analog TV. Narrowband conversion of frequency as used in applicant's invention facilitates automatic gain control of DTV signal strength applied to the transmission line, so the DTV receiver is operated at a gain just short of overloading the first mixer. This maximizes signal to noise plus interference ratio. High $S/(N+I)$ facilitates adaptation of the weighting coefficients the channel-equalization filtering of a DTV receiver uses to overcome multipath distortion. Controlling signal levels applied to the DTV receiver causes

its input impedance to be more predictable and facilitates proper termination of the transmission line to avoid reflections or “echoes” that give rise to multipath distortion that hampers DTV signal reception. DTV signal reception can suffer complete loss of reception owing to so-called “cliff effect” when echoes are strong. Analog TV signals are not susceptible to cliff effect. Applicant is unaware of any prior-art publication specifically linking the problems of channel-equalization filtering in a DTV receiver to reflections in the antenna download. Even the later published ad hoc group report is only suggestive as to this link. So, on the prior art known to applicant and currently of record, there is no evidence that one of ordinary skill in the art of DTV receiver design would have been aware of these problems.

Sugiura does not describe the use of channel-equalization filtering of a digital signal. Note that channel-equalization filtering, which flattens out the hills and valleys multipath reception causes in the frequency response of one channel of TV signal, is different from band equalization that compensates for increased attenuation at upper frequency channels.

Sugiura does not describe solutions to the problems of receivers for DTV signals from terrestrial television broadcast transmitters sufficiently to place one of ordinary skill in the art of DTV design in possession of applicant’s invention. See **In re Spada**, 15 USPQ2d 1655, 1657 (CA FC 1990). Sugiura would not be considered reasonably pertinent to the solution of these problems, as prospectively considered without recourse to applicant’s inventive teaching. Sugiura is not an enabling reference against applicant’s invention, according to the **In re Oetiker** test.

At most, Sugiura may suggest it is obvious to try narrowband amplification as an alternative to wideband amplification between reception antenna and DTV receiver. **In re O’Farrell**, 853 F.2d 894, 903, 7 USPQ 2d 1673, 1681 (CA FC 1988) was indicated in **In re Eli Lilly & Co.**, 902 F.2d 943, 14 USPQ 2d 1741, 1743 (CA FC 1990) to define “obvious to try” as when prior art gives “only general guidance as to the particular form of the claimed invention or how to achieve it”. An “obvious-to-try” situation exists when a general disclosure may pique the scientist’s curiosity, such that further investigation might be done as a result of the disclosure, but the disclosure itself does not contain sufficient teaching of how to obtain the desired result or that the claimed result would be obtained if certain directions were pursued. **In re Eli Lilly &**

Co., op. cit. Obvious to try is not the standard of 35 U.S.C. § 103. **In re Tomlinson**, 53 CCPA 1421, 363 F.2d 198, 150 USPQ 623 (1966); **In re Dien**, 54 CCPA 1027, 371 F. 2d 886, 152 USPQ 550 (1967); **In re Goodwin**, 576 F.2d 375, 377, 198 USPQ 1, 3 (CCPA1978); **In re Yates**, 663 F.2d 1054, 211 USPQ 1149 (CCPA1981).

A fundamental error in the rejection is the attempt to negative applicant's invention based on speculation as to how his invention could have been made by one of ordinary skill in the art, which is impermissible examining practice. Patentability shall not be negated by the manner in which the invention was made. **35 USC 103(a)**, final sentence. To determine the patentability under 35 USC 103(a) of a combination of known elements connected in a different way, the obviousness of the results obtained by the differences of connection must be evaluated.

Disregard for the unobviousness of the results of "obvious to try" experiments disregards the "invention as a whole" concept of § 103. **In re Dien**, 54 CCPA 1027, 371 F.2d 886, 152 USPQ 550 (1967), **In re Wiggins**, 55 CCPA 1356, 397 F.2d 356, 158 USPQ 199 (1968), **In re Antonie**, 559 F.2d 618, 195 USPQ 6,8 (CCPA 1977). There is no question that the results of narrowband amplification between the reception antenna and the DTV receiver in regard to avoiding problems with the first mixer of the DTV receiver are much better than one of ordinary skill in the art would have expected in 2001 from the prior art currently of record. There is no serious question that results of narrowband amplification between the reception antenna and the DTV receiver in regard to avoiding problems with multipath reception are much better than one of ordinary skill in the art would have expected from the prior art currently of record. The courts regularly find patentability under 35 USC § 103 where the results of "obvious to try" experiments are unexpectedly good. See **In re Waymouth**, 499 F.2d 1273, 182 USPQ 290 (CCPA 1974); **In re Antonie**, Id.; **In re Merck & Co., Inc.**, 800 F.2d 1091, 1097, 231 USPQ 375, 379 (CA FC 1986); **In re Fine**, 837 F.2d 1071, 1075, 5 USPQ2d 1596, 1599 (CA FC 1988); **In re Geiger**, 815 F.2d 686, 688 2 USPQ2d 1276,1278 (CA FC 1987).

Summing up, claim 1 and claims 2, 3 and 22 dependent therefrom are patentable because, at the time applicant made his invention, one of ordinary skill in the art would not have been aware of how to achieve the results available from the invention. The industry experts in the Ad Hoc Group assembled to evaluate VSB Performance sought future 8VSB performance

improvements had not contemplated changing overall receiver layout until applicant proposed such change. The change, however minor, mitigated several reception problems at once, which is indicative of a good system invention, requiring a range of inventive thought beyond that expected from a routineer of ordinary skill in the art. The results available from the invention were ones that were later on actively sought after in the DTV receiver industry, as evidenced in part by the paper titled "Television Receiver Optimization in the Presence of Adjacent Channel Interference". Improving reception in the presence of multipath reception has been a continuing concern of ATSC. So, applicant's changing of overall receiver layout was a significant invention in a rapidly developing new electronic design art and was recognized as being so by experts in the DTV industry.

Regarding claim 2, it is to be noted that it is fundamental that ordinarily the novelty in a claim to a combination does not repose in the elements themselves, but rather in the way in which they are interconnected. To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. **In re Royka**, 490 F.2d 981, 180 USPQ 580 (CCPA 1974); MPEP 2143.03. "All words in a claim must be considered in judging the patentability of that claim against the prior art". **In re Wilson**, 424 F.2d 1382, 165 USPQ 494,496 (CCPA 1970). In rejecting claim 2, the transmission line, an important element of the claimed combination is overlooked. The words "the tuner of claim 1 is connected by said transmission line to a digital television signal receiver" are ignored in the comparison with Han made in the final office action. Neither Han nor Sugiura suggest a particular place to interpose a transmission line in the Han DTV receiver, so as to result in a successful receiver system.

The consistent criterion for determination of obviousness is whether the prior art would have suggested to one of ordinary skill in the art that this process should be carried out and would have a reasonable likelihood of success, viewed in light of the prior art. [Citations omitted.] Both the suggestion and the expectation of success must be founded in the prior art, not in the applicant's disclosure. **In re Dow Chemical Co.**, 837 F.2d 469, 5 USPQ2d 1529, 1531 (CA FC 1988). See also **In re Vraek**, 947 F.2d 488, 20 USPQ2d 1438, 1442 (CA FC 1991).

The rejection of claim 3 is based on the mistaken assertion that Han's mixer 44 converts the first intermediate-frequency signal to a radio-frequency signal in a frequency range that can be detected by a broadcast digital television receiver. Han indicates as follows:

The IF signal amplified in the IF amplifier 6 is multiplied (tuned) in the mixer 44 with the local oscillation signal LO3 generated from a third local oscillator 42, and is thereby frequency-converted to a signal close to the baseband. In the present invention, one embodiment will be described in which the pilot signal of 46.69 MHz outputted from the mixer 44 as illustrated in FIG. 3, is frequency-converted to the pilot signal of 2.69 MHz as illustrated in FIG. 6.

A DTV signal with pilot frequency of 2.69 MHz is about 8 MHz at highest frequency, well below the VHF band receivable by a broadcast DTV receiver.

It is further noted that Han's mixer 44 is a *down-converter* converting from the conventional 40-45 MHz intermediate frequency to a still lower frequency close to baseband to accommodate a lithium niobate SAW filter. This is a technique taught in U.S. patent No. 5,479,449 issued 26 December 1995 to C. B. Patel and applicant. This down conversion has nothing to do with converting an IF DTV signal upward in frequency to a VHF or UHF signal receivable by a broadcast digital television receiver. This down conversion teaches away from applicant's claim 3 invention, rather than towards it.

To put claim 3 into better form, should appeal from final rejection be undertaken, claim 3 is amended to distinguish more explicitly from Han's mixer 44 converting an IF DTV signal downward in frequency to very few MHz. As currently amended, claim 3 specifies "frequency-conversion apparatus for converting said further amplified response to said first intermediate-frequency signal upward in frequency to generate a radio-frequency signal in a frequency range that can be detected by a broadcast digital television receiver". Han's down-conversion of IF teaches away from up-conversion, rather than suggesting applicant's up-conversion of IF. Han's DTV receiver applies the Costas principle to the bandpass phase tracker invented by Patel and applicant, which is described in U.S. Pat. No. 5,479,449. The final IF signal close to baseband accommodates subsequent analog-to-digital conversion and digital synchrodyne to baseband. At the same time the final IF signal is high enough in frequency to accommodate the use of a SAW filter. Modifying the Han DTV receiver to make the mixer 44 up-convert from IF would destroy the apparatus for its intended purpose. If proposed modification would render the prior art

invention being modified unsatisfactory for its originally intended purpose, then there is not suggestion or motivation to make the proposed modification. **In re Gordon**, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (CA FC 1984); **MPEP § 2143.01**.

In rejecting claim 22, the Examiner seeks to equate the claimed bandpass coupler with an equalizer used to make uniform the levels of the different channel signals. However, the bandpass coupler is not supplied with several different channel signals in the claimed invention. So, it clearly is not used as an equalizer to compensate for transmission line attenuation of signals occupying higher-frequency channels. (Anyway, this would be accomplished by a highpass coupler rather than a bandpass coupler). Furthermore, reference should be made to the specification in interpreting the scope of a claim. The paragraph bridging pages 8 and 9 of the specification, reproduced below, clearly sets forth the function performed by the bandpass coupler.

“The bandpass coupler **19** is a *wideband* filter, which can be constructed using inductors and capacitors, but can be more compactly constructed using ceramic resonator elements. The bandpass coupler **19** *is transparent to the IF signal supplied from the cable-driver amplifier 18*, but presents a high impedance to the coaxial cable **20** at the low frequencies at which power is cabled up to the remote tuner **10** via the cable **20**. This high impedance usually is owing to the inclusion of a blocking capacitor in the connection of the bandpass coupler **19** to the center conductor of the coaxial cable **20**. The bandpass coupler **19** *also presents a high impedance to the coaxial cable 20 at frequencies where the cable 20 carries other signals in frequency multiplex with the IF signal supplied from the cable-driver amplifier 18.*”

These functions are not equalization of the amplitudes of different TV channels, as Examiner hypothesized when attempting to reconstruct Applicant's claim 22 apparatus to provide basis for a 35 USC 103 rejection.

There is no transmission line in Han to have losses, so the comments of the Examiner concerning matching amplifier output impedance to the transmission line to maximize transmission efficiency are merely speculative.

There is no transmission line in Han to cause reflections that tax the adaptive equalizer, and Sugiura's analog TV reception system does not include an adaptive equalizer. So, there is nothing in these references to suggest that down-converting various TV channels to the same intermediate frequencies would help the adaptive equalizer, by making it easier to match

amplifier output impedance to the transmission line, thereby to avoid reflections that worsen multipath distortion.

Respectfully submitted,



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Attachments: Portions of Report of Ad Hoc Group on 8VSB Performance
Bendov & Patel paper
Transmittal Form
Fee Transmittal Form & Credit Card Payment Form
Copy of Fee Transmittal Form & Patent Application Fee Determination Record